Mercury Thermometer Exchange Program

Report of Activities - 2005

Rhode Island Department of Health
Office of Environmental Health Risk Assessment
March 2006

EXECUTIVE SUMMARY

Rhode Island is a much safer place since 33 pounds of mercury from thermometers and other items (e.g., mercury switches & thermostats) were collected during the Rhode Island Department of Health's (HEALTH) third annual series of community mercury thermometer exchanges held May 21, August 19, and August 20, 2005. Approximately 430 individuals participated in this opportunity to properly dispose of approximately 1,100 mercury thermometers and 126 other items which contained a significant quantity of mercury.

These thermometer exchanges are designed to get mercury-containing products safely out of circulation before accidental or intentional contamination occurs. The quantity of mercury released from even a single broken thermometer can cause a significant degree of contamination in the home. They not only present a health risk but also pose a problem to those who want to dispose of them safely. Other potential sources of mercury exposures in homes may present an even greater public health risk. The 1,098 thermometers (each containing approximately 0.0273 ounces of mercury) collected during this event were only responsible for approximately 1.9 (5.6%) of the 33 pounds of mercury collected. Removing these 126 other mercury-containing items from circulation prevents a public health impact equivalent to the collection of nearly 18,250 mercury-containing thermometers.

The incentive for participants, in addition to protecting the environment, was to offer a digital thermometer in exchange for their mercury-containing thermometers. Each participant also received literature about related environmental topics, such as mercury in fish and proper disposal of home-generated medical waste. HEALTH partnered with many agencies, including a hospital and local fire companies, to make these exchange days successful.

Mercury recycling programs are the best way to prevent further environmental mercury contamination and exposures. Breathing fumes, eating contaminated fish, or contacting spilled mercury exposes people to its harmful effects. Elemental mercury also provides a ready method for intentionally contaminating unsuspecting facilities such as hospitals, schools and public buildings. There have been numerous incidents at schools and similar facilities in other states where accidental or intentional mercury contamination has caused children to be taken to area hospitals. In addition, schools had to be shut down until the facility could be decontaminated, causing a significant strain on already tight and over-extended budgets. The public health and economic impact could be even greater with an intentional release involving larger quantities of elemental mercury. Removing 33 pounds of mercury in thermometers and other items from the community and disposing of it properly is one step in limiting the potential for both accidental and intentional mercury exposure in Rhode Island.

INTRODUCTION

Although Rhode Island banned the sale of mercury-containing fever thermometers as of January 1, 2002, this legislation didn't address handling or disposal of mercury-containing thermometers already in residential use. Thermometers are one of the many potential sources of mercury exposure in a home. Accidental mercury releases from broken thermometers and thermostats in the home present a risk to families, as well as to the community. During 2005, the Poison Control Hotline (serving Rhode Island and Massachusetts) received 328 calls about broken mercury thermometers and thermostats, 97 of which pertained specifically to RI[1].

The quantity of mercury released from even a single broken thermometer can cause a significant degree of contamination in the home. Thermometer collection programs aim to get mercury-containing products safely out of circulation before accidental or intentional contamination occurs. If not handled and disposed of properly, elemental mercury poses an extremely high risk of contamination for other unsuspecting facilities such as hospitals, schools and public buildings. There have been numerous incidents at schools and similar facilities in other states where mercury contamination has caused children to be taken to area hospitals. In addition, schools had to be shut down until the facility could be decontaminated, causing a significant strain on already tight and over-extended budgets. The public health and economic impact could be even greater with an intentional release involving larger quantities of elemental mercury. Furthermore, unless mercury is collected and sent to special recycling facilities, the mercury in thermometers and other devices will gradually contribute to environmental mercury contamination. Mercury thrown in the trash goes to either incinerators or landfills, neither of which stop mercury from escaping into the environment. Much of this mercury contamination eventually makes its way to lakes and rivers where it contaminates many kinds of fish. Breathing fumes, eating contaminated fish, or contacting spilled mercury exposes people to its harmful effects.

This report summarizes the mercury thermometer collection activities sponsored by HEALTH and its community partners during the calendar year 2005.

PLANNING AND LOGISTICS

HEALTH, in partnership with the Exeter Fire Department (366 Nooseneck Hill Road), Little Compton Fire Department (60 Simmons Road), Middletown Fire Department (239 Wyatt Road), Rhode Island Department of Environmental Management (DEM), North Scituate Fire Department (201 Danielson Pike), Portsmouth Fire Department (2300 East Main Road), South Kingstown Fire Department (Kingston Fire Department @ URI-35 Bills Road) and Westerly Fire Department (1 Langworthy Road), sponsored collection sites on May 21, August 19, and August 20, 2005. Exchange participants were asked to bring a mercury thermometer or other mercury-containing item, in its original container or sealed plastic bag, to any of the drop-off locations.

[1] Regional Center for Poison Control and Prevention, personal communication, February 2006.

Extensive planning and coordination is needed in order to make an exchange a success.

- **Volunteer Recruitment**

  The volunteers who worked at the collection sites were recruited by contacting partners participating in the exchange and coordinating personnel between sites.

- **Program Advertisement**

  HEALTH issued a press release to inform the public about this mercury thermometer exchange. Information about the mercury thermometer collection days were also placed on HEALTH's website. Additionally, the event was advertised in the newspaper, on local radio stations (including an exclusive interview on WADK), and with fliers posted at a variety of businesses in several communities around the state. E-mail was an essential tool used to inform others about this event as were the signs posted at each individual site the day of the exchange.

- **Program Incentives**

  In exchange for a thermometer or other household items that contained mercury, each participant received a free digital thermometer. Participants were also provided with literature about related environmental health topics (i.e., mercury in fish, proper disposal of home-generated medical waste).

- **Program Evaluation**

  Information was gathered from each participant the day of exchange, such as what town they lived in, how they heard about the mercury thermometer exchange program, how many thermometers they were exchanging, as well as if they had other mercury-containing products to drop-off that day. Analysis of this information revealed several interesting patterns (c.f., **Results** below) and will be a valuable tool for determining future exchange locations.

RESULTS

Approximately 430 individuals participated in this opportunity to dispose of thermometers and other items which contained a significant quantity of mercury. Approximately 33 pounds of mercury was collected, including approximately 1,100 thermometers and 126 other mercury-containing items (e.g. mercury switches & thermostats). As noted above, thermometers are one of many potential sources of mercury exposure in homes. They not only present a health risk but also pose a problem to those who want to dispose of them safely. Other potential sources of mercury exposures in homes may present an even greater public health risk. To help put this fact into proper perspective, the 1,098 thermometers (each containing approximately 0.0273 ounces of mercury) were responsible for only 1.9 (5.6%) of the 33 pounds of mercury collected. The 126 other items accounted for over 94% of the mercury collected. Removing these other mercury-containing items from circulation prevents a public health impact equivalent to the collection of nearly 18,250 mercury-containing thermometers. Photos of some collected items are included in **Appendix B**.

Data from 2003 and 2004 series of thermometer exchanges appeared to indicate that the majority of participants would be from either the host community or no more than two towns away. This trend continued during the 2005 series of exchanges.

Figure 1 presents data for the city/town of residence for the 18 participants utilizing the Little Compton drop-off site. As might be expected, slightly over 61% of the participants were from Little Compton [11]. An additional 30% were from the neighboring community of Tiverton [6]. The only other participant was from Smithfield.

Figure 2 presents similar data for the 36 participants utilizing the Middletown drop-off site. Slightly over 66% of the participants were from Middletown [24]. An additional 22% were from surrounding communities [Newport (6); Portsmouth (2)]. The remainder [4] were from other cities/towns across the State.

Figure 3 presents similar data for the 35 participants utilizing the Portsmouth drop-off site. Slightly over 74% of the participants were from Portsmouth [26]. The remainder were from nearby Newport [5] and Bristol Counties [4] (RI and MA).

Figure 4 presents similar data for the 77 participants utilizing the South Kingstown drop-off site. Slightly over 48% of the participants were from South Kingstown [37]. An additional 31% were from surrounding communities [North Kingstown (12); Narragansett (12)]. The remaining 21% were from Washington County [8] and other cities/towns across the State [8].

Figure 5 presents similar data for the 46 participants utilizing the Westerly drop-off site. Exactly 50% of the participants were from Westerly [23]. An additional 32% were from surrounding communities [Charlestown (10); Hopkington (5)]. The remaining 17% were from Washington County [3] and other cities/towns across the State [5].

Figure 6 presents similar data for the 88 participants utilizing the Exeter drop-off site. Only 15% of the participants were from Exeter [13]. However, slightly over 41% were from surrounding communities [West Greenwich (15); North Kingstown (11); Richmond (5); Hopkington (4); South Kingstown (1)], and an additional 38% were from near-by Kent County. The remaining 6% were from other cities/towns across the State [6].

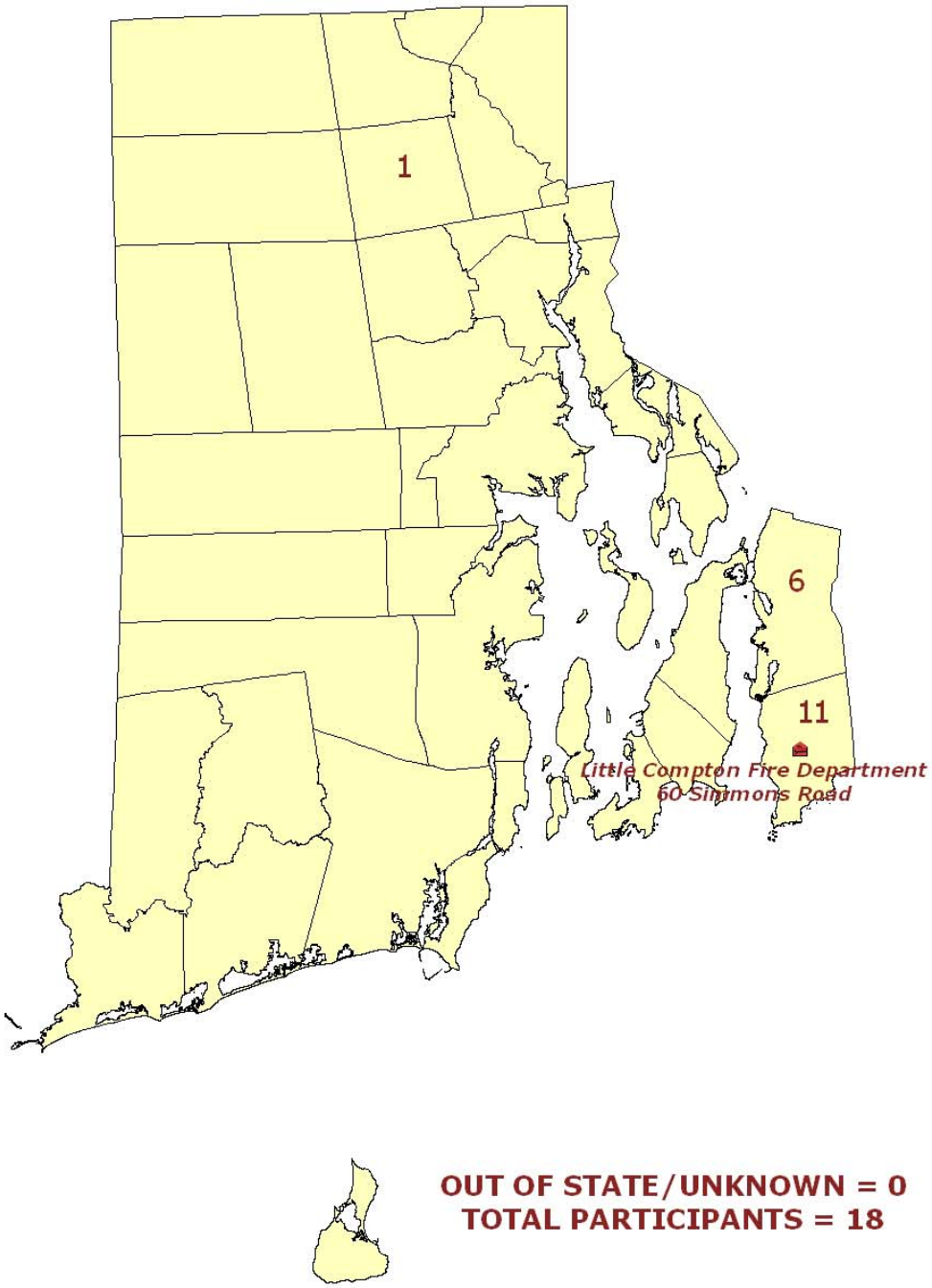
Figure 7 presents similar data for the 129 participants utilizing the North Scituate drop-off site. Slightly over 44% of the participants were from Scituate [57]. An additional 28% were from surrounding communities [Smithfield (19); Johnston (17)]. Of the remaining participants, 23% were from Providence County [30] and 5% were from other cities/towns across the State [5].

Table 1 summarizes city/town of residence data for all 429 community-based program participants in this third annual series of thermometer exchanges.

Table 2 summarizes data on the number of mercury-containing items dropped-off by each community-based program participant. Just over 5% of the participants only dropped-off "other" mercury containing items. Approximately 35% of the participants dropped off only a single thermometer [13.8% of total collected]. Another 49% of the participants handed-in between 2-5 thermometers [51.5% of total collected]. The remaining 11% of the participants [6-23 thermometers each] accounted for 34.7% of the total collected.

FIGURE 1

PARTICIPANT CITY/TOWN
MERCURY THERMOMETER EXCHANGE
21 MAY 2005



OUT OF STATE/UNKNOWN = 0
TOTAL PARTICIPANTS = 18

FIGURE 2

PARTICIPANT CITY/TOWN
MERCURY THERMOMETER EXCHANGE
21 MAY 2005

OUT OF STATE/UNKNOWN = 1
TOTAL PARTICIPANTS = 36

FIGURE 3

PARTICIPANT CITY/TOWN
MERCURY THERMOMETER EXCHANGE
21 MAY 2005

OUT OF STATE/UNKNOWN = 2
TOTAL PARTICIPANTS = 35

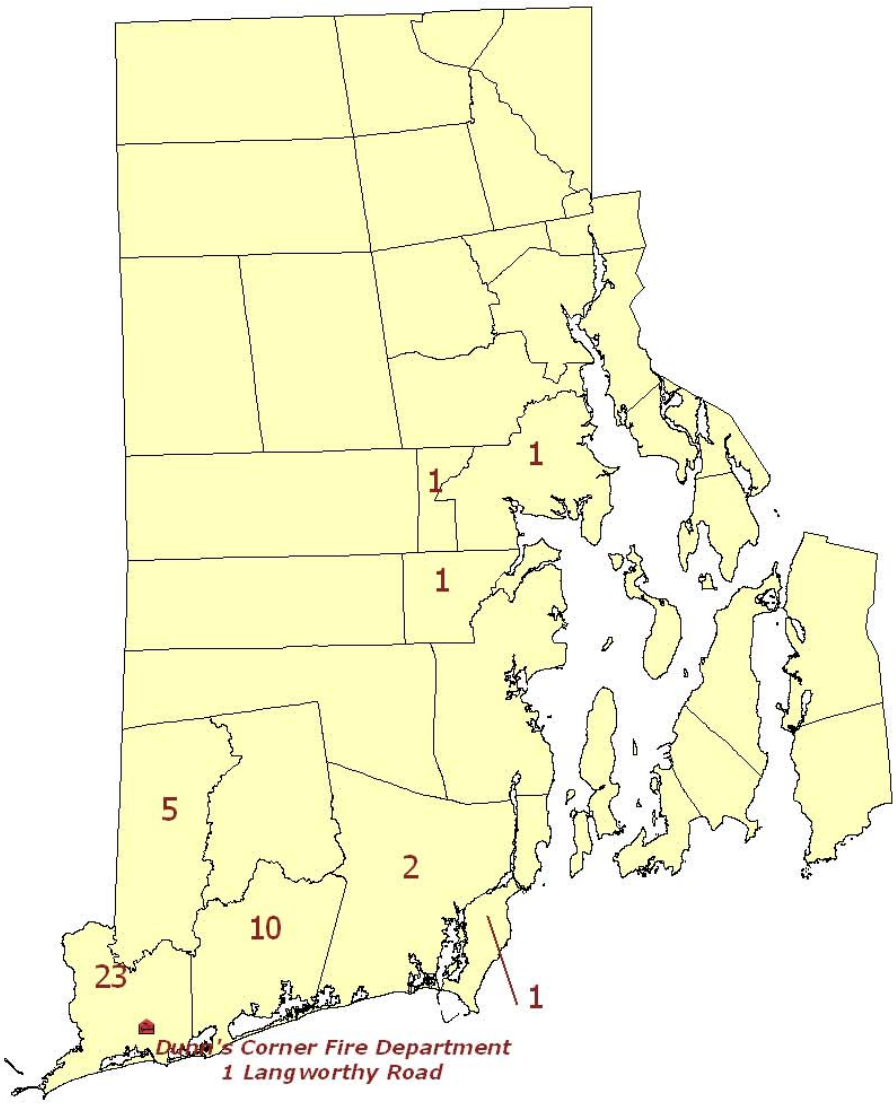
FIGURE 4

PARTICIPANT CITY/TOWN
MERCURY THERMOMETER EXCHANGE
19 AUGUST 2005

OUT OF STATE/UNKNOWN = 1
TOTAL PARTICIPANTS = 77

FIGURE 5

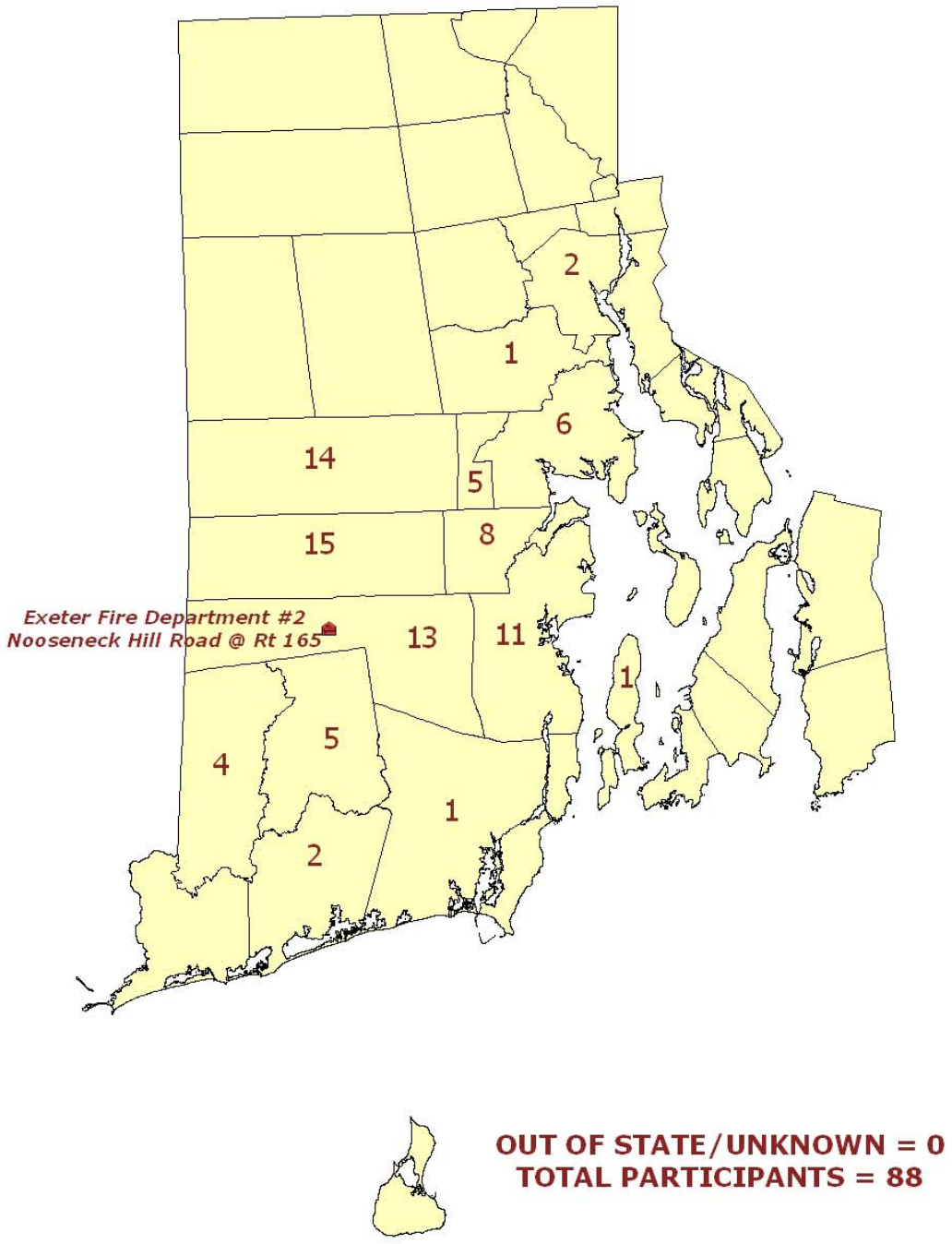
PARTICIPANT CITY/TOWN
MERCURY THERMOMETER EXCHANGE
19 AUGUST 2005



OUT OF STATE/UNKNOWN = 2
TOTAL PARTICIPANTS = 46

FIGURE 6

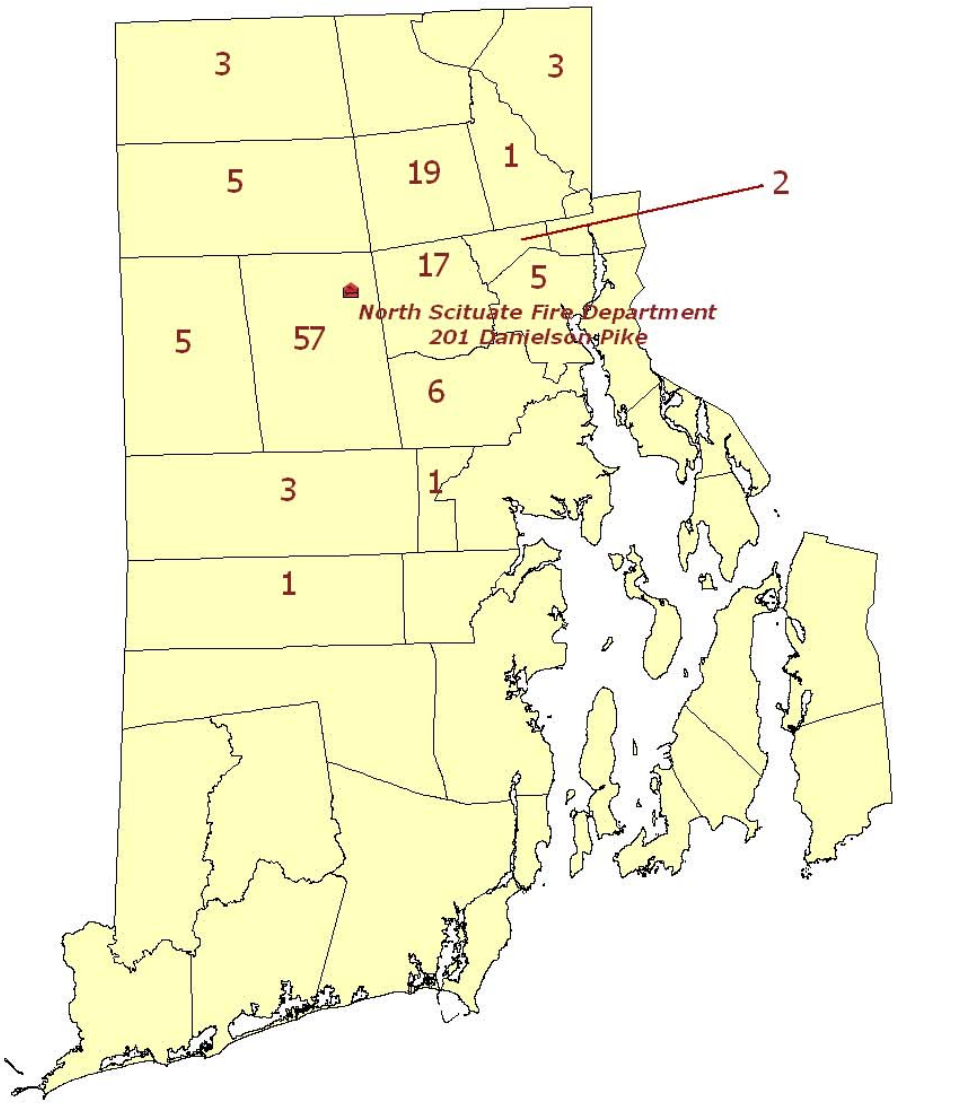
PARTICIPANT CITY/TOWN
MERCURY THERMOMETER EXCHANGE
20 AUGUST 2005



OUT OF STATE/UNKNOWN = 0
TOTAL PARTICIPANTS = 88

FIGURE 7

PARTICIPANT CITY/TOWN
MERCURY THERMOMETER EXCHANGE
20 AUGUST 2005



OUT OF STATE/UNKNOWN = 1
TOTAL PARTICIPANTS = 129

TABLE 1

PARTICIPANT CITY/TOWN OF RESIDENCE - 2005 - ALL SITES

City/Town	Little Compton	Middletown	Portsmouth	South Kingstown	Westerly	Exeter	North Scituate	TOTALS
Barrington	0	1	2	0	0	0	0	**3**
Bristol	0	0	2	0	0	0	0	**2**
Burrillville	0	0	0	0	0	0	3	**3**
Central Falls	0	0	0	0	0	0	0	**0**
Charlestown	0	0	0	2	10	2	0	**14**
Coventry	0	0	0	1	0	14	3	**18**
Cranston	0	0	0	3	0	0	6	**9**
Cumberland	0	0	0	0	0	1	3	**4**
East Greenwich	0	0	0	1	1	8	0	**10**
East Providence	0	2	0	0	0	0	0	**2**
Exeter	0	0	0	3	0	0	0	**3**
Foster	0	0	0	0	0	13	5	**18**
Glocester	0	0	0	0	0	0	5	**5**
Hopkington	0	0	0	1	5	4	0	**10**
Jamestown	0	0	0	1	0	1	0	**2**
Johnston	0	0	0	0	0	0	17	**17**
Lincoln	0	0	0	0	0	0	1	**1**
Little Compton	11	0	0	0	0	0	0	**11**
Middletown	0	24	0	0	0	0	0	**24**
Narragansett	0	0	0	12	1	0	0	**13**

TABLE 1

PARTICIPANT CITY/TOWN OF RESIDENCE - 2005 - ALL SITES

City/Town	Little Compton	Middletown	Portsmouth	South Kingstown	Westerly	Exeter	North Scituate	TOTAL
Newport	0	6	2	0	0	0	0	**8**
New Shoreham	0	0	0	0	0	0	0	**0**
North Kingstown	0	0	0	12	0	11	0	**23**
North Providence	0	0	0	0	0	0	2	**2**
North Smithfield	0	0	0	0	0	0	0	**0**
Pawtucket	0	0	0	0	0	0	0	**0**
Portsmouth	0	2	26	0	0	0	0	**28**
Providence	0	0	0	0	0	2	5	**7**
Richmond	0	0	0	2	0	5	0	**7**
Scituate	0	0	0	0	0	0	57	**57**
Smithfield	1	0	0	0	0	0	19	**20**
South Kingstown	0	0	0	37	2	0	0	**39**
Tiverton	6	0	1	0	0	1	0	**8**
Warren	0	0	0	0	0	0	0	**0**
Warwick	0	0	0	1	1	6	0	**8**
Westerly	0	0	0	0	23	0	0	**23**
West Greenwich	0	0	0	0	0	15	1	**16**
West Warwick	0	0	0	0	1	5	1	**7**
Woonsocket	0	0	0	0	0	0	0	**0**
Non RI/ Unknown	0	1	2	1	2	0	1	**7**
TOTAL:	**18**	**36**	**35**	**77**	**46**	**88**	**129**	**429**

TABLE 2

TOTAL ITEMS COLLECTED - 2005 - ALL SITES

Thermometers	Little Compton	Middletown	Portsmouth	South Kingstown	Westerly	Exeter	North Scituate	TOTAL
1	10	15	9	24	16	35	42	**151**
2	3	12	10	23	13	20	40	**242**
3	3	2	0	12	7	14	18	**168**
4	1	1	0	3	1	3	11	**80**
5	0	0	1	3	1	5	5	**75**
6	0	2	2	3	2	3	3	**90**
7	1	1	0	2	2	0	3	**63**
8	0	0	2	2	0	0	1	**40**
9	0	0	0	0	0	2	1	**27**
10	0	0	0	1	0	1	0	**20**
11	0	1	0	0	0	0	0	**11**
12	0	0	1	0	1	1	2	**60**
14	0	0	0	0	0	1	0	**14**
15	0	0	0	0	1	0	0	**15**
19	0	0	0	0	0	0	1	**19**
23	0	0	0	0	0	0	1	**23**
Total:	**36**	**79**	**74**	**191**	**125**	**226**	**367**	**1098**
Other Items:	**1**	**27**	**40**	**39**	**5**	**7**	**7**	**126***
Grand Total:	**37**	**106**	**114**	**230**	**130**	**233**	**374**	**1224**

***Other Items:** 58 thermostats; 46 large lab thermometers; 10 jars/bottles/vials containing liquid mercury; 8 mercury switches; 3 button batteries; 1 barometer.

CONCLUSIONS

Primary prevention is an important public health function. For mercury, primary prevention means safely collecting mercury-containing products and removing them from circulation before contamination occurs. HEALTH's third annual series of community mercury thermometer exchanges proved to be a very successful primary prevention activity and removed 33 pounds of mercury from circulation.

HEALTH believes the success of this outreach effort is directly related to three factors:

- Willingness to participate in something that benefits their community;
- Coming to a local (i.e., within one town), familiar place like a fire station; and
- Receiving something for free.

Although HEALTH organized these thermometer exchanges, the degree of success achieved would not have been possible without the contributions of numerous community partners (c.f., **Appendix A**). The overall impact of this event can also be measured by the fact that all of our partner organizations expressed an interest in continuing to work together for future exchanges, while some additional community partners have come forward and volunteered to participate in future activities. HEALTH has also agreed to provide technical assistance to fire companies and other community groups who want to independently sponsor mercury thermometer exchange days in the future.

RECOMMENDATIONS FOR FUTURE ACTIVITIES

- Continue to:
  - Encourage fire companies to independently conduct future exchange programs.
  - Solicit additional community partners to assist in this effort.
  - Rotate drop-off locations according to community needs.
  - Stagger hours that drop-off locations are open according to community needs.
  - Allow more lead-time to advertise the thermometer exchange programs as well as explore different avenues to advertise besides press release (i.e. radio).
  - Restrict distribution of incentives to the day of the exchange.
- Implement a more reliable waste disposal plan in order to plan yearly exchange dates.

APPENDIX A

3rd Annual Mercury Thermometer Exchanges

Community Partners - 2005

Exeter Fire Department
Little Compton Fire Department
Middletown Fire Department
North Scituate Fire Department
Portsmouth Fire Department
R.I. Dept of Environmental Management (DEM)
R.I. Department of Health (HEALTH)
South Kingstown Fire Department
Westerly Fire Department

APPENDIX B

Photographs of Items Collected